

REMARKS

This Amendment and Reply seeks to place this application in condition for allowance. Certain claims have been amended to more clearly describe the invention, to more fully protect the invention, to improve grammar and to correct inadvertent typographical errors. None of these amendments were motivated by patentability considerations in view of the prior art, including the art presented or cited during the prosecution of this application. Further, six (6) new dependent claims have been added to more fully protect the inventions described and illustrated in the application. These claims are fully supported by the specification. No new matter has been added.

Finally, all of the objections and rejections raised in the Office Action of October 18, 2005 (hereinafter the "Office Action") have been addressed. Each of the objections and rejections are addressed below in detail and in the order presented in the Office Action.

Claim Rejection under 35 USC §§ 102 and 103

In the Office Action, all of the claims were rejected as being either anticipated by or obvious based on Lutz¹, Published International Application WO 01/77009 (hereinafter, "the '009 Application") in view of Vossen (Thin Film Processes, pages 309-311) and/or the "admitted prior art" (Specification, pages 1-2). (See, the Office Action, paragraphs 2-7). Applicants respectfully disagree that the '009 Application anticipates or renders obvious (whether alone or in combination) the claimed inventions.

For at least the reasons set forth below, the pending claims are neither anticipated by nor obvious to one skilled in the art in view of the '009 Application (whether alone or in

¹ In addition to being the sole inventor of the subject matter of the '009 Application, Markus Lutz is a joint inventor of the subject matter claimed in the instant application.

combination).² In an effort to present a more concise response, Applicants' response focuses on certain aspects of independent claims 9, 16 and 23. The reasons set forth below are *not* the only reasons the inventions of the independent and/or dependent claims are patentable over the '009 Application, either alone or in combination with other art (whether such art is of record or not). As such, no inference or conclusion should be drawn that Applicants' response is exhaustive whether with respect to the independent or dependent claims.

Lutz, Published International Application WO 01/77009

The '009 Application describes a microelectromechanical device having a micromechanical structure 6 disposed over a substrate 1 and in a chamber. (Page 7, line 29 and Figure 4). The micromechanical structure 6 is formed by etching in and through silicon layer 5, which is deposited on a first silicon oxide sacrificial layer 4. (See, for example, Page 7, lines 15-29, and Figure 2). In addition, contact trenches, signal line trenches and anchor trenches (labeled "7") are formed in and through silicon layer 5. (See, for example, Page 6, lines 29-32 and Figures 1 and 2).

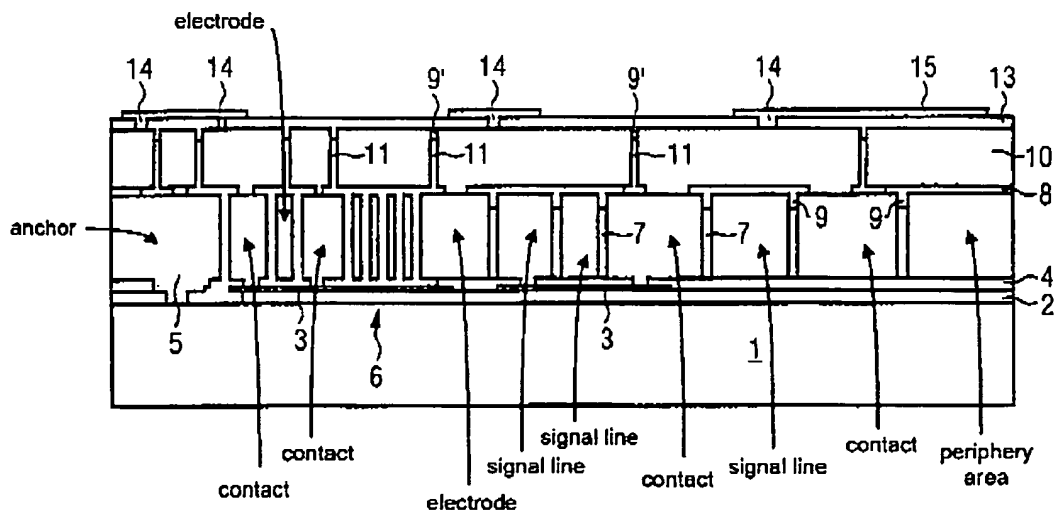
A second silicon oxide sacrificial layer 16 is then deposited on and around micromechanical structure 6 and the contacts and anchor structures (see, for example, Page 7, lines 31-35 and Figure 2) and is thereafter patterned to form, among other things, contact holes 22 (see, for example, page 8, lines 5-10 and Figure 2).)

The '009 Application then deposits polysilicon layer 10 on second silicon oxide sacrificial layer 16 and over micromechanical structure 6, and the signal lines, contacts and

² Moreover, no inference or conclusion should be drawn that the previously pending claims were unpatentable in view of the '009 Application (whether alone or in combination with other prior art). Indeed, such claims were/are patentable.

anchor structures. (See, Page 7, lines 25-35, page 8, lines 17-21 and Figure 3). Trenches 11 are then formed in polysilicon layer 10 to provide for etching of selected portions of the first and second sacrificial silicon oxides 4 and 8 as well as for isolation of the contacts and signal lines in layer 10. (See, Figure 3 and page 8, lines 30-32). That is, after formation of trenches 11, portions of first and second sacrificial silicon oxides 4 and 8 are (vapor) etched thereby releasing micromechanical structure 6 and, among other things, forming (i) a chamber in which micromechanical structure 6 resides and (ii) contacts and signal line isolation from other portions of polysilicon layer 10. (See, Page 9, line 8-15, Figure 4).

After releasing micromechanical structure 6, silicon oxide sealing layer 13 is deposited on polysilicon layer 10 to seal the chamber and define an atmosphere for structure 6 in the chamber. (See, for example, Figures 4 and 5, and page 9, lines 1-5 and lines 21-26). Various features of the structure illustrated in Figure 4 of the '009 Application are labeled below. Although the labeled features may be apparent from the overall cross-section, should the Examiner prefer a Declaration in support thereof, please feel free to contact the undersigned.



In sum, although the walls of the chamber are formed from, among other things, contact areas, buried polysilicon layer 3, polysilicon layer 10 and second sealing oxide 13, the chamber includes micromechanical structure 6, contacts and signal lines. (See, Figure 4). The periphery area, contacts and/or fixed electrodes do not include a plurality of gaps. The trenches 7 as well as the other contact and isolation trenches in first functional layer 5 are not related to the periphery area but rather form among other things such features as the contacts, signal lines, anchor and fixed electrodes. The contacts, signal lines, anchor and fixed electrodes are not the periphery area. Moreover, the contacts, signal lines, anchors, fixed electrodes, as well as the periphery area, are illustrated as solid and/or contiguous structures (See, Figure 4; see also, the discussion in Instant Application on page 3). Accordingly, the microelectromechanical device of the '009 Application does not include, among other things,

- a periphery area disposed over the substrate, wherein the periphery area includes a plurality of gaps, wherein the plurality of gaps is disposed in the chamber and exposed to the fluid (see claims 9 and 23), and/or
- a getter area comprising a plurality of gaps which are disposed in predetermined portions of the periphery area and the fixed electrode and wherein the getter area is disposed in the chamber and exposed to fluid in the chamber (see claim 16).

Claimed Invention

There are many inventions described in the instant application. In an effort to present a more concise response, the discussion below will focus on only certain aspects or features of the claimed inventions. As mentioned above, this response is not exhaustive; however, for the sake of brevity, these remarks focus on only some of the patentable features of the independent claims.

Independent Claim 9

Independent claim 9 describes a microelectromechanical device comprising a mechanical structure disposed over a substrate, wherein at least a portion of the mechanical structure is disposed in a chamber having a fluid disposed therein. The microelectromechanical device further includes, among other things, a periphery area disposed over the substrate, wherein the periphery area includes a plurality of gaps therein, wherein the plurality of gaps is disposed in the chamber and exposed to the fluid. A thin film encapsulation structure is disposed over the mechanical structure and the periphery area to partially define and to seal the chamber.

Independent Claim 16

Independent claim 16 also describes a microelectromechanical device comprising a mechanical structure disposed over a substrate wherein the mechanical structure includes moveable and fixed electrodes. The device includes, among other things, a periphery area disposed over the substrate and a getter area comprising a plurality of gaps, wherein the plurality of gaps is disposed in predetermined portions of the periphery area and the fixed electrode. Among other things, the getter area is disposed in the chamber and wherein the getter area is exposed to fluid in the chamber. A thin film encapsulation structure, disposed over the mechanical structure, periphery area and getter area, seals the chamber.

Independent Claim 23

Independent claim 23 also describes a microelectromechanical device comprising a mechanical structure at least a portion of which is disposed in a chamber having a fluid disposed therein. The microelectromechanical device includes, among other things, a periphery area which includes a plurality of gaps, wherein the plurality of gaps is

disposed in the chamber and exposed to the fluid. A thin film encapsulation structure is disposed over the mechanical structure and the periphery area to partially define and seal the chamber, wherein thin film encapsulation structure includes a first encapsulation layer and a second encapsulation layer.

The '009 Application Does NOT Anticipate the Claimed Inventions

Simply put, the '009 Application does not anticipate the claimed inventions.

In this regard, the '009 Application does not teach, among other things, a microelectromechanical device having:

(i) a mechanical structure, (ii) a periphery area including a plurality of gaps therein, wherein the plurality of gaps is disposed in the chamber and exposed to the fluid, and (iii) a thin film encapsulation structure disposed over the mechanical structure and the periphery area to partially define and to seal the chamber (see, for example, claim 9 and 23), and/or

(i) a mechanical structure, (ii) a getter area comprising a plurality of gaps which is disposed in predetermined portions of the periphery area and the fixed electrode and wherein the getter area is disposed in the chamber and exposed to fluid in the chamber, and (iii) a thin film encapsulation structure, disposed over the mechanical structure, periphery area and getter area, to seal the chamber (see, for example, claim 16).

The '009 Application describes a different microelectromechanical device wherein the chamber includes such structures as micromechanical structure 6, contacts, signal lines, anchor and fixed electrodes – but not a periphery area having a plurality of gaps therein and exposed to the fluid in the chamber. The contacts, signal lines, anchor and

fixed electrodes, as well as the periphery area, are illustrated as solid and/or contiguous structures (See, the '009 Application, Figure 4). The trenches 7, as well as the other contact and isolation trenches in first functional layer 5, are not related to the periphery area but rather form among other things such features as the contacts, signal lines, anchor and fixed electrodes. Such features are not the periphery area of the micromechanical device. Thus, although the walls of the chamber are formed from, among other things, the walls of the periphery area, buried polysilicon layer 3, polysilicon layer 10 and second sealing oxide 13, the chamber does not include a periphery area having a plurality of gaps therein which are exposed to the fluid in the chamber.³

Notably, the contacts, signal lines, anchor and fixed electrodes and periphery area of the '009 Application appear to be solid and/or contiguous structures – and lack a plurality of gaps therein. (See, the '009 Application, Figure 4).⁴

The '009 Application Does NOT Render Obvious the Claimed Inventions

The '009 Application does not suggest or motivate one skilled in the art to provide a microelectromechanical device having, among other things, a periphery area including a plurality of gaps therein, wherein the plurality of gaps is disposed in the chamber and exposed to the fluid (see claims 9 and 23). There is simply no suggestion or

³ Moreover, the contacts, fixed electrodes and anchors also do not include plurality of gaps therein which are exposed to the fluid in the chamber.

⁴ In this regard, to the extent that polysilicon layer 10 is being read as the periphery which includes a plurality of gaps (for example, formed by trenches 11), the '009 Application does not include a plurality of gaps in periphery wherein the plurality of gaps is disposed in the chamber and exposed to the fluid, and a thin film encapsulation structure is disposed over the mechanical structure and the periphery area to partially define and to seal the chamber (see, for example, claims 9 and 23). Again, the periphery area of the '009 Application appears to be comprised of generally solid and/or contiguous structures.

motivation to provide the claimed periphery area (having a plurality of gaps) in the chamber and exposed to the fluid. Indeed, the '009 Application illustrates a periphery area that is a solid and/or contiguous structure.

Moreover, there is no suggestion or motivation to include a getter area comprising a plurality of gaps which is disposed in predetermined portions of the periphery area and the fixed electrodes and wherein the getter area is disposed in the chamber and exposed to fluid in the chamber (see claim 16).

**The '009 Application in combination with Vossen
does not render obvious the claimed inventions**

Vossen provides no help in this regard. Vossen appears to be offered for the proposition that different dielectrics are common materials and therefor suitable substitutes for those described in the '009 Application. Because Vossen offers nothing with respect to the periphery area and/or getter area (among other things), in an effort to present a more concise response, Applicants provide no comment on the Examiner's comments. No inference or conclusion should be drawn that Applicants agree with the Examiner's characterization of Vossen.

**The '009 Application in combination with the "Admitted Prior Art"
does not render obvious the claimed inventions**

The so-called "admitted prior art" also provide no help. First, as discussed above, the '009 Application does not teach "the device of claims 16-22, except for the use of a getter layer." (Office Action, paragraph 6, page 6). Notably, claims 16-22 recited a getter area – not getter layer – disposed in predetermined portions of the periphery area and the fixed electrodes wherein the getter area is disposed in the chamber

and exposed to fluid in the chamber. (See, original claim 16). There is absolutely no getter area, as set forth in original or amended claim 16, in either the '009 Application or the "admitted prior art".

Second, Applicants respectfully disagree that Applicants' statements regarding conventional MEMS devices admit or provide any support to render obvious the claimed inventions. To be clear, the fact that certain conventional MEMS devices (i.e., those devices having a mechanical structure that is hermetically sealed metal or ceramic package) included a getter material seems to bear little connection to the claimed inventions other than both include a micromechanical structure.

Third, Applicants disagree that the "admitted prior art" teaches that MEMS (including resonators) "typically include moveable electrodes, fixed electrodes, anchors, periphery area and 'often includes a getter area to 'capture' impurities, atoms, and or molecules that are outgassed"⁵ (See, the Office Action, pages 6-7, paragraph 6). To the contrary, the conventional MEMS devices, having a mechanical structure that is hermetically sealed metal or ceramic package, included a getter material – not a getter area (for example, as described in the claims). (See, page 2, lines 18-20, of the instant application).

Applicants clearly state that a getter material is not suitable for MEMS devices employing a thin film encapsulation approach – including the encapsulation technique of the '009 Application. In this regard, Applicants state, on page 3, lines 4-12 of the instant application, that:

due to subsequent processing (often at high temperatures), thin film wafer level packaged MEMS are not able to effectively employ a getter material to

⁵ Notably, the Examiner has misquoted the Applicants' specification by replacing "getter material" with "getter area".

"capture" impurities, atoms and/or molecules that are out-gassed from surrounding materials.

Fourth, Applicants respectfully disagree that the so-called "admitted prior art" suggests in any way that "the getter area, (figure 1B), as described above, would then include the gaps in portions of the periphery area and the fixed electrodes." (See, the Office Action, page 7, paragraph 6). Indeed, the Applicants' specification expressly states the opposite – that is, "the fixed electrodes and the periphery area tend to be solid or contiguous structures (see, for example, fixed electrode 16a and periphery area 22 in FIGURES 1A and 1B)" (Page 1, lines 19-21, of the instant application) and "the fixed electrodes and the periphery area are solid and/or contiguous structures" (Page 2, lines 7-9, of the instant application).

Accordingly, the "admitted prior art" does not teach, admit or even suggest, among other things, that "the getter area ... would then include the gaps in portions of the periphery area and the fixed electrodes." (Id.). There is absolutely no evidence provided in the Office Action to substantiate such a position. Further, the instant application makes clear that such statements are erroneous (see, for example, page 3 of the instant application) and, indeed, there is no teaching or suggestion in the instant application to provide support for the obviousness positions based thereon.

In sum, the obviousness rejections based in part on the so-called "admitted prior art" are nothing more than "hindsight reconstruction" using the Applicants' disclosure as a template for (1) the combination and (2) the motivation therefor. That is, for example, the positions that

- "the getter area, (figure 1B), as described above, would then include the gaps in portions of the periphery area and the fixed electrodes", and/or

- "it would have been obvious to one skilled in the art ... to modify [the '009 Application] to include a getter area as taught by the admitted prior art to be typical ..." (See, the Office Action, page 7, paragraph 6)

lack any evidentiary basis and are hindsight reconstruction using the Applicants' disclosure as a template for not only the combination but also the motivation therefor. The use of "hindsight reconstruction" is strictly prohibited. (See, e.g., MPEP 706.02(j)).

Rejection based on Personal Knowledge of the Examiner

Pursuant to 37 CFR §104(d)(2), to the extent the Examiner relies on his own personal knowledge, Applicants respectfully request that he support his personal knowledge by affidavit. For example, the Examiner has provided or identified no evidence (for example, teaching or suggestion in the prior art) for the proposition that it would have been obvious to provide a "getter area" as defined in, for example, claims 16-22, in the microelectromechanical device of the '009 Application. (See, the Office Action, paragraph 6, page 6). Further, there is no evidence provided in the Office Action to substantiate the position that "the getter area, (figure 1B), as described above, would then include the gaps in portions of the periphery area and the fixed electrodes." (See, the Office Action, paragraph 6, page 7). Moreover, the Examiner has provided or identified no evidence for the position that "it would have been obvious to one skilled in the art ... to modify [the '009 Application] to include a getter area as taught by the admitted prior art to be typical" (Id.). There is simply no evidence of any kind to support such assertions.⁶

⁶ Notably, it appears that the Examiner has erroneously equated "getter area" (as defined in the claims) to both "gettering layer" and "getter material" (see, the Office Action, paragraph 6, pages 6-7).

In sum, to the extent the Examiner relies on his own personal knowledge, which appears to be the case, Applicants respectfully request that he support his personal knowledge by affidavit. Obviously, no inference or conclusion should be drawn that Applicants agree, in any way, with such assertions.

Other Rejections in the Office Action

No inference or conclusion should be drawn that Applicants agree, in any way, with the rejections set forth in the Office Action – even where such rejections are not particularly, individually and/or specifically addressed herein. In an effort to provide a more concise response, Applicants do not comment on the positions and/or rejections not essential to the patentability of the claims. No inference or conclusion should be drawn that Applicants agree, in any way, with such rejections or positions relating thereto.

Further, as mentioned above, no inference or conclusion should be drawn that Applicants believe that the previously pending claims (independent or dependent) were unpatentable in view of the instant amendment.

Dependent Claims

As mentioned above, for the sake of brevity, this response does not present the additional reasons/bases that the dependent claims are patentable over the '009 Application, whether alone or in combination. Those reasons/bases are numerous. However, for at least the reasons stated above, the dependent claims are neither anticipated by nor obvious in view of the '009 Application, whether alone or in combination.

CONCLUSION

Applicants respectfully request entry of the foregoing amendments and reconsideration of the instant application. Applicants submit that the pending claims present patentable subject matter. Accordingly, allowance of the claims is respectfully requested.

It is noted that should a telephone interview expedite the prosecution of this application in any way, the Examiner is invited to contact the undersigned at the telephone number listed below.

Date: March 10, 2006

Respectfully submitted,



Neil A. Steinberg, Reg. No. 34,735
Telephone No. 650-968-8079